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Infundibulocystic Structures and Prominent Squamous Metaplasia in Sebaceoma—A Rare Feature. A Clinicopathologic Study of 10 Cases

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Key Words: adnexal neoplasm, sebaceous tumor, sebaceoma, infundibulocystic

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INTRODUCTION

Sebaceoma is a distinct benign tumor with sebaceous differentiation usually arising as a solitary nodule on the face or scalp. It histologically manifests a multinodular architecture without or only focal connection to the epidermis, with neoplastic nodules predominantly composed of small basaloid immature sebaceous cells admixed with mature sebocytes. Focal sebaceous ductal differentiation can be encountered. Since the introduction of the term "sebaceoma" by Troy and Ackerman in 1984, certain distinctive histopathologic patterns of this benign sebaceous tumor have been described in the literature.[1–5] Approximately 25%–30% of sebaceomas are estimated to manifest an organoid pattern including labyrinthine/sinusoidal (intricate, extremely complex, often tortuous arrangement of closely packed strands, and cords of neoplastic cells, showing focally wider, sinusoidal spaces of stroma between the neoplastic elements), rippled (arrangement of neoplastic cells in parallel rows resembling Verocay bodies in schwannoma), petaloid, and carcinoid-like (neoplastic cells forming trabeculae, ribbons, rosettes, and pseudorosettes).[3–9] A rare variant is so-called seboapocrine sebaceoma, occurring sporadically or in association with nevus sebaceus, wherein in addition to a predominant sebaceous component, there are areas with apocrine differentiation.[10–12] In this study, we describe a rare and underrecognized feature in sebaceoma, namely numerous infundibulocystic structures, occurring alone or in combination with squamous metaplasia. When unduly prominent, this feature may represent a diagnostic pitfall in a limited biopsy specimen.

MATERIAL AND METHODS

The study was based solely on light microscopy. Hematoxylin and eosin-stained slides from approximately 200 sebaceomas were retrieved from our consultation, institutional, and personal files and reviewed. Lesions occurring in association with nevus sebaceus of Jadassohn were excluded.[13] Ten sebaceomas featuring conspicuous infundibulocystic structures were found, and these represented the basis of this study. The infundibulocystic structures were defined as keratocysts surrounded by a multilayered flattened epithelium of mostly eosinophilic squamous cells containing a thin granular cell layer, an inner mostly concentrically arranged cornified layer, and an outer layer of small basophilic cells, with or without occasional mature sebocytes. The distribution of infundibulocystic structures (multifocal vs. unilocular and scattered vs. grouped) was estimated. We also recorded the occurrence of squamous metaplasia and other unusual features, if present. The clinical information was obtained from original pathology reports and submitting pathologists.

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The authors declare no conflicts of interest.

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TABLE 1. Main Clinicopathological Features

Case	Sex	Age	Location	Clinical Diagnosis	Size, mm	Infundibulocystic Structures	Squamous Metaplasia
1	M	31	Temporal	Nevus	11	Multifocal	+
2	M	72	Scalp	NA	10	Unifocal	−
3	M	NA	Forehead	Dermatofibroma	10	Unifocal	+
4	M	64	Scalp	NA	9	Unifocal	+
5	NA	NA	NA	NA	5	Unifocal	−
6	M	39	Scalp	Nevus	10	Unifocal	−
7	M	42	Scalp	Atheroma	15	Unifocal	−
8	M	22	Scalp	NA	14	Multifocal	+
9	F	89	Scalp	Fibroma	20	Multifocal	+
10	NA	NA	NA	NA	20	Multifocal	+

NA, not available.

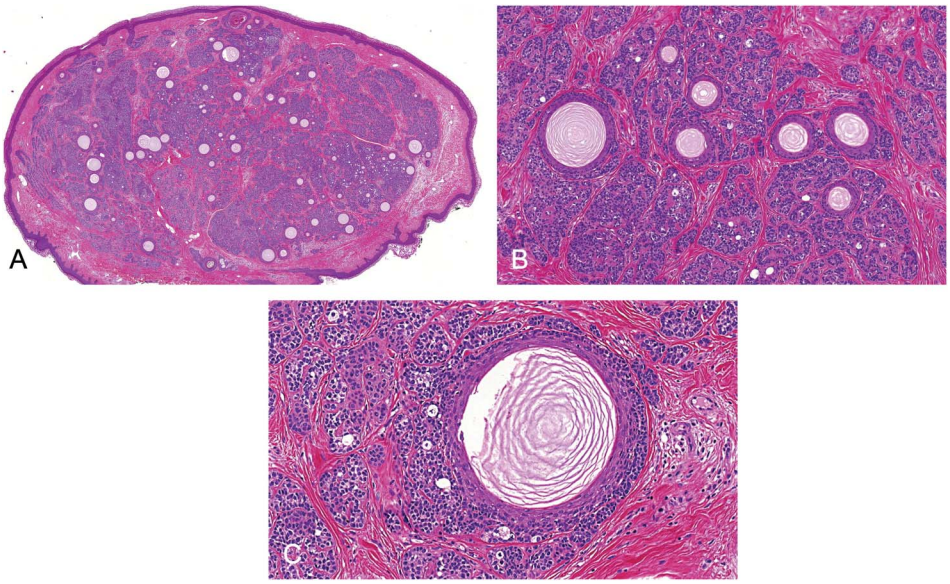

FIGURE 1. Sebaceoma with a multifocal distribution of infundibulocystic structures. The major part of the tumor consists of small basaloid cells intermingled with occasional mature sebocytes. Focally, a labyrinthine/sinusoidal-like growth pattern can be recognized (A, B). Note numerous infundibulocystic structures scattered throughout the lesion. A close-up of an infundibulocystic structure: A circular keratocyst surrounded by a multilayered flattened epithelium of eosinophilic cells containing a thin granular cell layer, an inner cornified layer with lamellated keratin, and outer layers of small, basophilic cells that merge with the main sebaceous tumor cells (C).

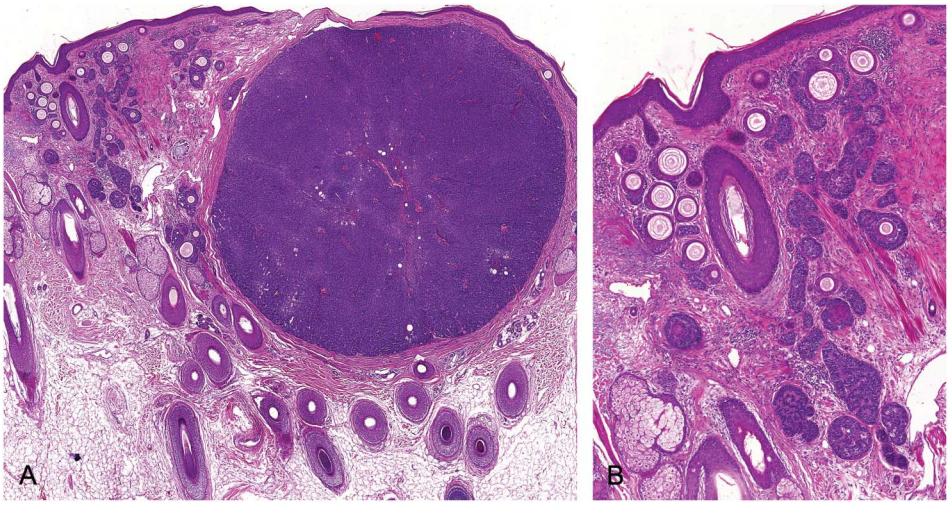

FIGURE 2. Sebaceoma with a mostly unilocular distribution of infundibulocystic structures separated from the main tumor bulk (A, B).

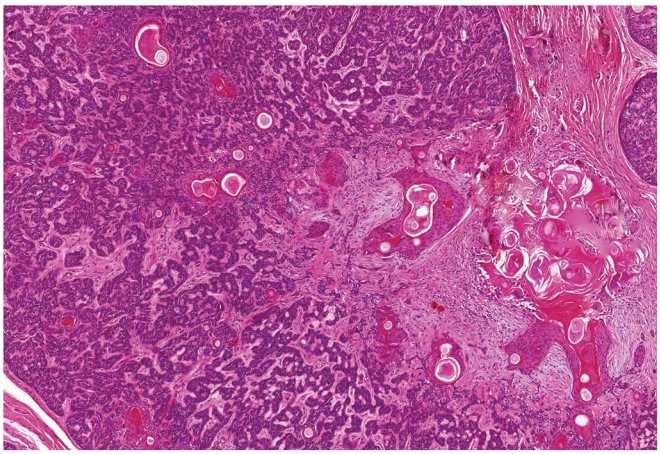

FIGURE 3. Prominent squamous metaplasia in sebaceoma.

RESULTS

Clinical Data

The patients, 7 men and 1 woman (for 2 cases clinical information was not available), clinically presented with a solitary, nonulcerated nodule located on the scalp or face (Table 1). The patient's ages ranged from 22 to 89 years (sex and age were unknown in 2 cases). The nodules appeared rather small, 5 of them between 5 and 10 mm, the biggest 2 tumors reaching 20 mm. Follow-up was not obtained.

Histopathological Findings

All tumors were well circumscribed and composed of multiple, variably sized nodules with smooth borders enveloped by compressed fibrous tissue. The predominant neoplastic cells were monomorphic basaloid cells with scanty cytoplasm (immature sebocytes) admixed with mature sebocytes having vacuolated cytoplasm and scalloped nuclei. All tumors revealed areas with a cohesive growth of cells and organoid patterns, including labyrinthine/sinusoidal, rippled, or carcinoid-like, occurring alone or in combination. The neoplasms were located in the dermis; focal connection to the epidermis/follicular infundibulum was seen in 4 cases. Ductal differentiation toward sebaceous ducts (small irregular ducts with crenulated inner lining, with or without sebaceous secretion material within the lumina) was evident. In one case, minor glandular formations with decapitation secretion were recognized.

Infundibulocystic structures were found either in a unilocular distribution (6 cases) or multifocally (4 cases) (Figs. 1, 2). They had a relatively thin multilayered wall of flattened eosinophilic squamous cells, granular cells, and an inner lamellated cornified layer. The basal layer was composed of small basaloid cells resembling epidermal basal cells as well as the predominant immature sebocytes, merging with the surrounding tumor cells. Occasionally, mature sebocytes were recognized at the periphery of infundibulocystic structures (Fig. 1C).

Apart from these infundibulocystic features, 6 lesions manifested areas of squamous metaplasia, which appeared as well-demarcated, roundish to irregularly shaped, solid aggregations of squamous cells surrounding central compact or concentrically arranged keratotic masses (Fig. 3). These were usually demarcated from infundibulocystic structures, but in one case, both infundibulocystic structures and metaplastic areas were in close vicinity to each other (Fig. 4). Areas with squamous metaplasia were often focally surrounded by a granulomatous infiltrate (foreign body reaction), and numerous concentric calcifications in the areas with squamous metaplasia were noted in one case.

DISCUSSION

We have presented 10 cases of sebaceoma, which revealed conspicuous infundibulocystic structures distributed

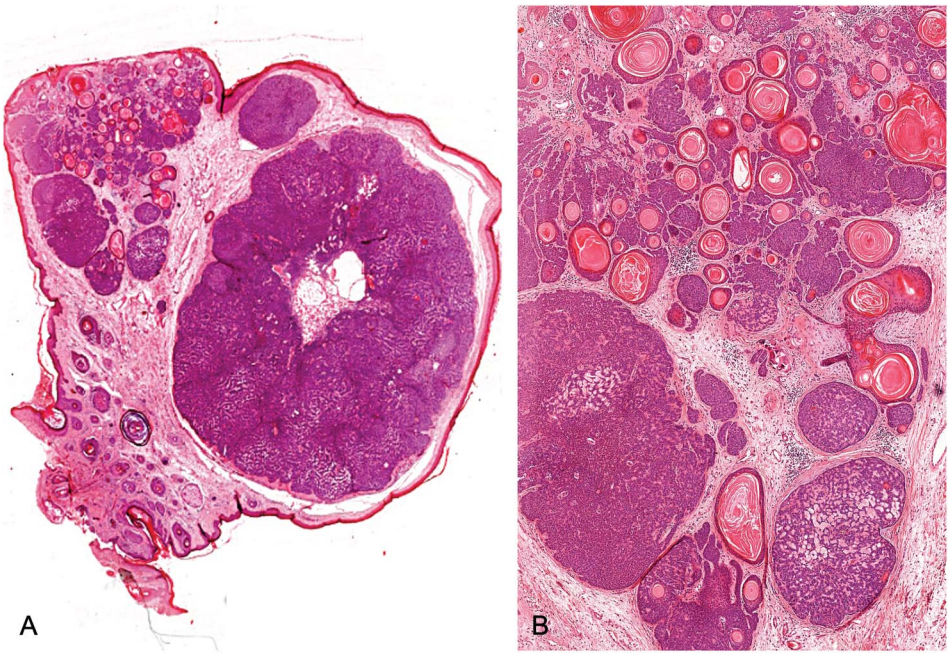

FIGURE 4. A sebaceoma in which infundibulocystic structures and areas of squamous metaplasia are mixed together (A, B).

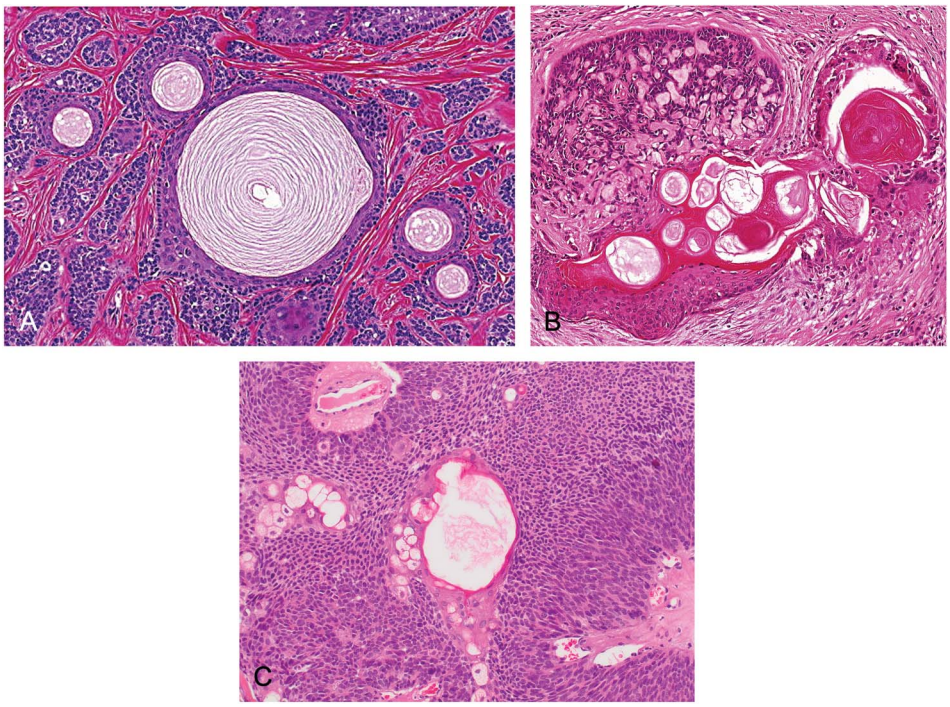

FIGURE 5. Comparison of infundibulocystic structures (A), areas of squamous metaplasia (B), and sebaceous ductal differentiation (C) in sebaceoma. Infundibulocystic structures are regularly shaped and composed of centrally located, concentric, lamellated keratin, surrounded by a thin granular cell layer, outside of which lie squamous cells surrounded by peripheral basaloid cells (A). In contrast to infundibulocystic structures, in areas with squamous metaplasia, the keratin is more compact, the lumina are more irregular, and no basaloid cells at the periphery is usually seen (B). Differentiation toward a sebaceous duct appears as a slightly irregular duct with a lumen containing eosinophilic masses (holocrine secretion) and lined by slightly crenulated eosinophilic cuticle, with many mature sebocytes in the vicinity.

diffusely within the tumors or forming aggregations, occasionally separated from the main tumor bulk. They were usually present in the superficial and peripheral parts of the tumors. These infundibulocystic structures were different from both sebaceous ductal differentiation and areas of squamous metaplasia (Fig. 5). We suggest that these structures represent a true differentiation toward the infundibular (and perhaps isthmic) portion of the hair follicle.[14,15] It is obviously a rare and underrecognized feature as our review of the literature did not disclose any systematic study on the topic. When unduly prominent, and especially in a limited biopsy specimen, this feature may cause to diagnostic difficulties in classifying these lesions as sebaceoma, as evidenced by 5 of the 10 lesions that represented consultation cases, whereby the submitting pathologists specifically discussed the unusual occurrence of infundibulocystic structures (keratocysts).

Areas wherein the infundibular structures dominated and were aggregated occasioned a resemblance to trichoadenoma.[16] It is unlikely that those cases represented a collision of 2 different adnexal tumor entities because the trichoadenoma-like features were distributed multifocally in 6 cases and merged with the immature sebaceous tumor cells. The latter were the predominant component in all sebaceomas, permitting their straightforward classifications as such. Partly, the neoplastic cells were arranged in a rippled and/or labyrinthine/sinusoidal and/or carcinoid-like pattern, which is a quite distinct feature of a subset of sebaceomas.

Conjoint sebaceous and follicular differentiation in skin adnexal tumors is well known, examples being trichoblastoma with sebaceous differentiation, nevus sebaceus with trichoblastoma/basal cell carcinoma and trichilemmoma with sebaceous differentiation.[17,18] The divergent, multidirectional differentiation found in one and the same tumor entity is explained embryologically by the derivation of the sebaceous glands and hair follicles (and apocrine glands) from the common folliculosebaceous-apocrine unit. This dogma is used to explain the occurrence of dual or even tripartite (apocrine, follicular, and sebaceous) differentiation in cutaneous adnexal tumors.[19–25]

In conclusion, infundibulocystic structures are a rare and underrecognized feature in sebaceoma. Presumably, they represent an authentic follicular differentiation, underscoring the potential of sebaceoma for multilineage differentiation in some cases. When prominent, segregated from the main tumor bulk or occurring in a limited biopsy specimen, these structures (and also prominent squamous metaplasia) may be misinterpreted as trichoadenoma or even microcystic adnexal carcinoma. In an adequate biopsy specimen, no diagnostic difficulties should arise.

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